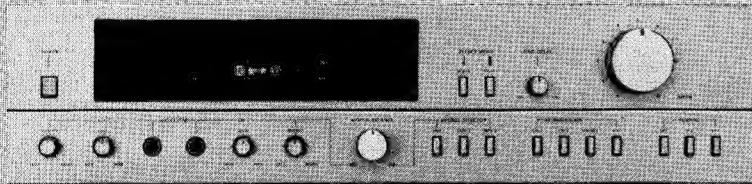


SERVICE MANUAL

REVERBERATION AMPLIFIER

SANSUI RA-990

(Silver & Black Model)



•SPECIFICATIONS

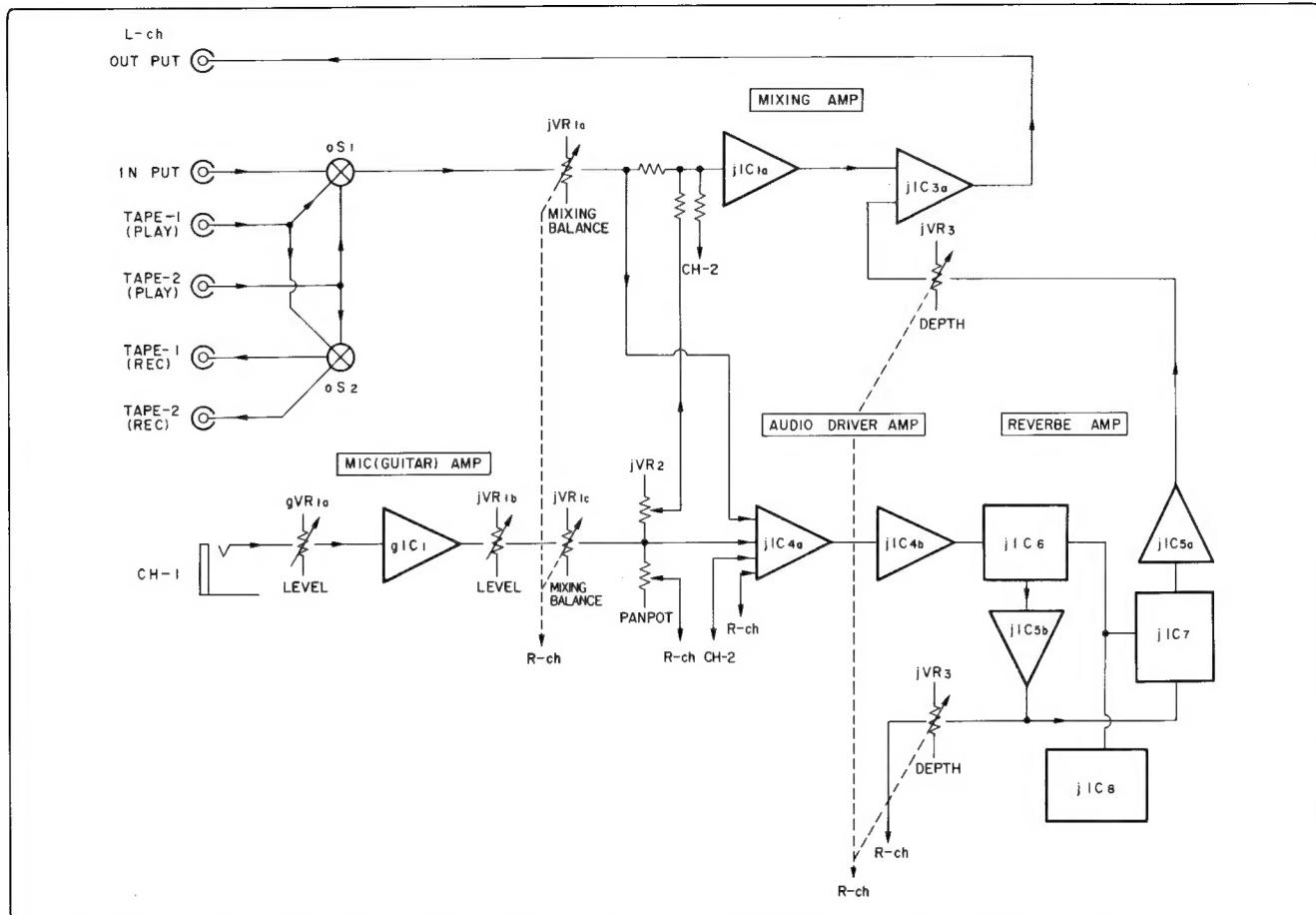
| | |
|---|--|
| Rated output voltage (reverberation off) | |
| TAPE REC | 150 mV/1 kohms |
| OUTPUT | 150 mV/1 kohms |
| Maximum output voltage (at 0.05 % total harmonic distortion) | 8 V |
| Input sensitivity and impedance (at 1 kHz) | |
| MIC (GUITAR) | 0.8 mV/10 kohms |
| SOURCE/TAPE | 150 mV/47 kohms |
| Total harmonic distortion (20 Hz to 20 kHz, at 3 V, reverberation off) | less than 0.025 % |
| Frequency response (at 1 V, reverberation off) | |
| SOURCE/TAPE | 10 Hz to 80,000 Hz, +0 dB, -3.0 dB |
| MIC (GUITAR) | 100 Hz to 15,000 Hz, +0 dB, -3.0 dB |
| Signal to noise ratio (at 3 V, A-network, short-circuit) | |
| MIC (GUITAR) | more than 82 dB |
| SOURCE | more than 90 dB |
| Reverberation time | |
| ECHO | 0 to 3 sec |
| DUET | 30 to 100 msec |
| Maximum input capability (at 1 kHz, 0.02 % T.H.D., reverberation off) | |
| SOURCE | 8 V |
| MIC (GUITAR) | 45 mV |
| Power requirements | |
| Power voltage | 120/220/240 V (50/60 Hz) |
| Power consumption | 15 W |
| Dimensions | 430 mm (16-15/16") W 112 mm (4-7/16") H 272 mm (10-3/4") D |
| Weight | 3.7 kg (8.2 lbs.) net 4.7 kg (10.4 lbs.) packed |

* Design and specifications subject to changes without notice for improvements.

Sansui

SANSUI ELECTRIC CO., LTD.

1. BLOCK DIAGRAM

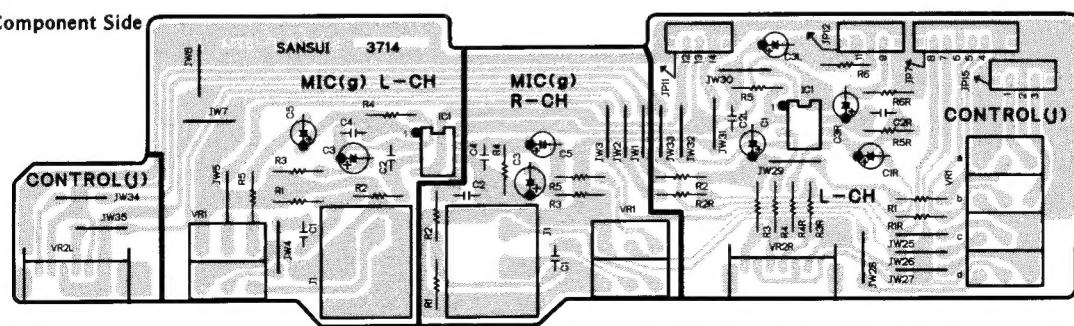


- Since the Reverberation Circuit, BBD IC and BBD clock Drive IC employed RA-990 are similar to those of RG-7, the explanation of these circuits are omitted from this manual, therefore please refer to the page 2 on service manual of RG-7.

2. PARTS LOCATION & PARTS LIST

2-1. F-3714 Control & Mic Amp. Circuit Board (Stock No. 00689101)

- Since some of capacitors and resistors are omitted from parts lists in this Service Manual, refer to the Common Parts List for capacitors & resistors, which was appended previously to Sansui Manual.



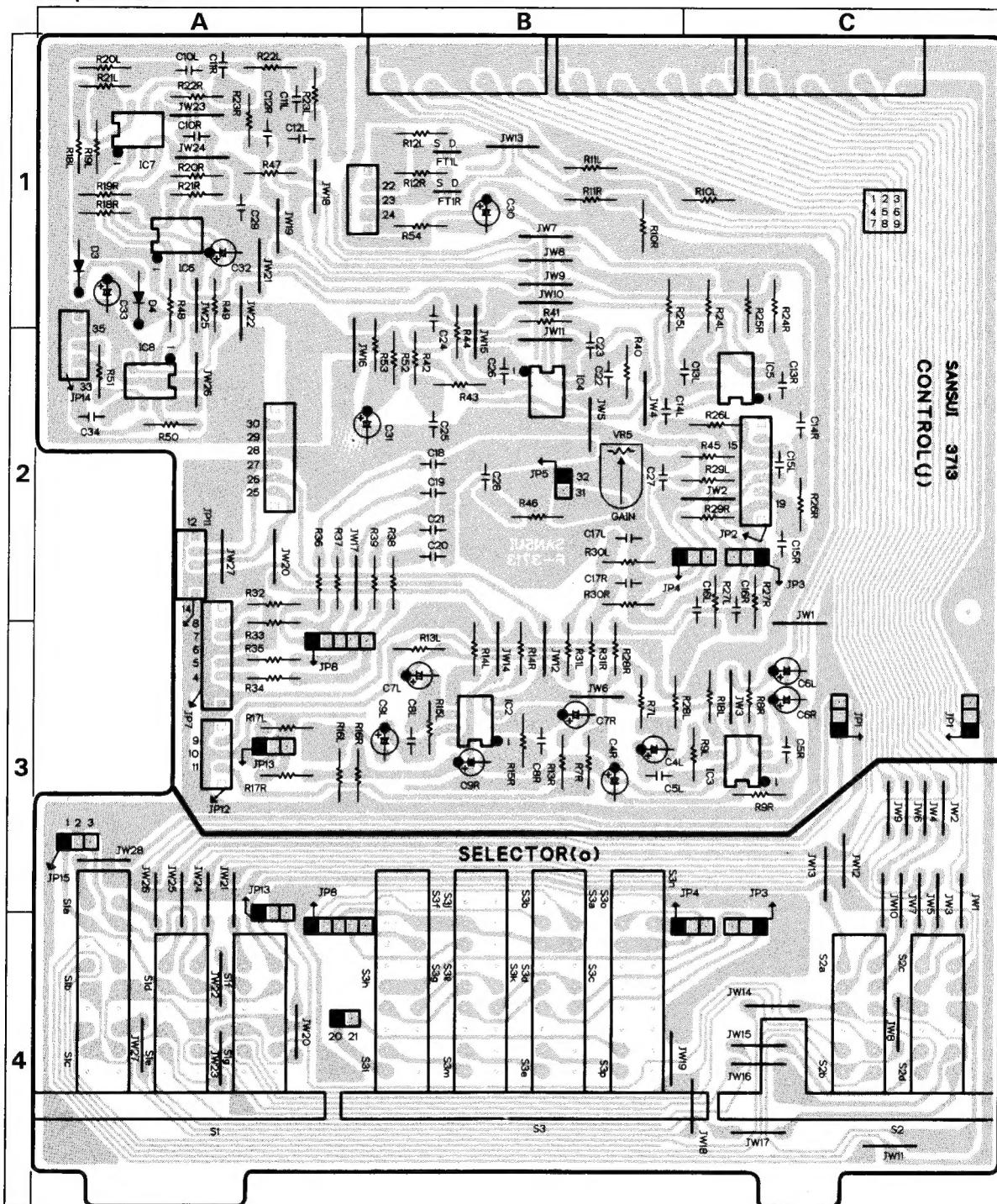
Parts List

| Parts No. | Stock No. | Description |
|-------------|-----------|----------------------------------|
| •IC jIC1 | 03607700 | NJM4558D |
| jVR1 | 46265800 | 250k Ω VR, MIXING BALANCE |
| jVR2 | 46266200 | 250k Ω VR, MIC PANPOT |

| Parts No. | Stock No. | Description |
|-----------|-----------|---------------------------------|
| oJ1 | 46266300 | Jack, MIC (GUITAR) |
| •IC | | |
| gIC1 | 07208900 | NJM4558D-X |
| gVR1 | 46266100 | 20k Ω (B), VR, MIC LEVEL |

2-2. F-3713 Control & Reverberation Amp. Circuit Board (Stock No. 00689001)

Component Side



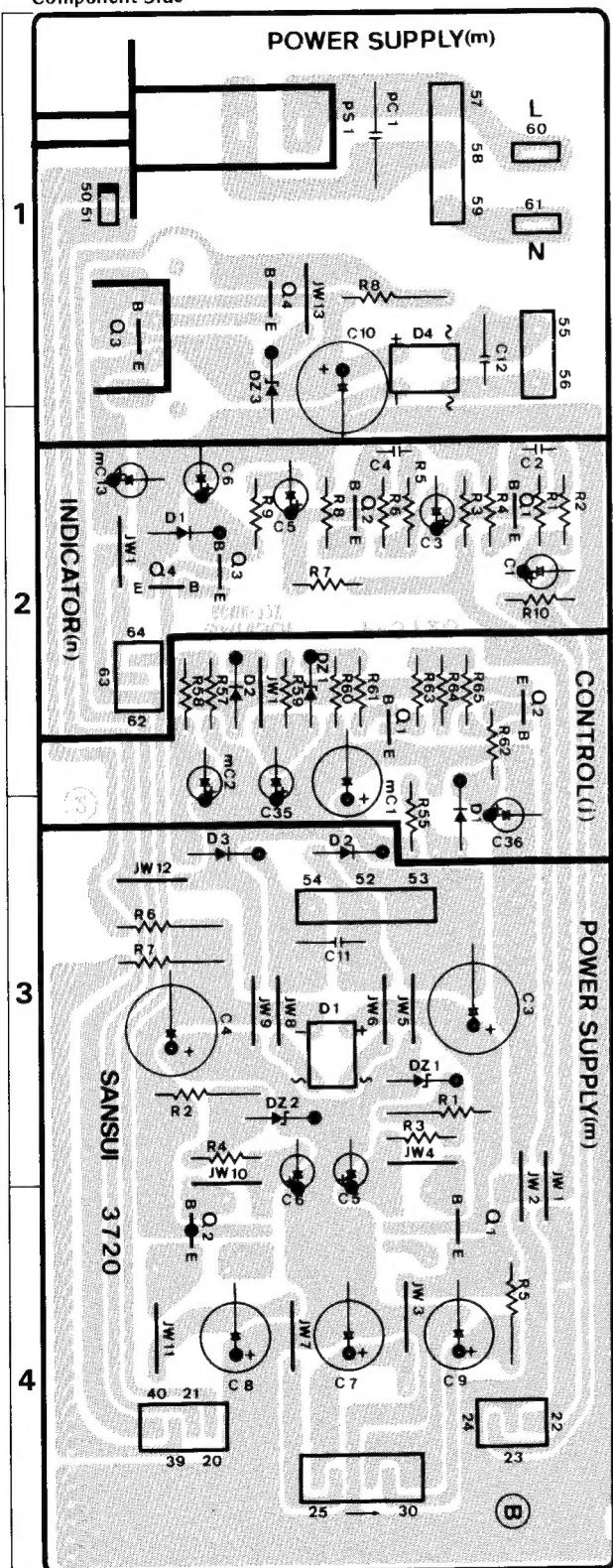
Parts List

| Parts No. | Stock No. | Description |
|-----------|-------------|-------------|
| •FET | | |
| jFT1 | 03703000 | 2SK117-O |
| | or 03703001 | 2SK117-Y |
| | or 03703400 | 2SK163-K1 |
| | or 03703401 | 2SK163-K2 |
| •IC | | |
| jIC2 ~ 5 | 03607700 | NJM4558D |
| jIC6, 7 | 46221500 | MN3007 |
| jIC8 | 46080300 | MN3101 |

| Parts No. | Stock No. | Description |
|------------------|-------------------------|--|
| ●Diode | | |
| jD3 | 03117600 or 46086000 | 1S2473 1S1588 |
| jD4 | 03117600 or 46086000 | 1S2473 1S1588 |
| jVR5 | 46264600 | 220k Ω (B) SVR, echo level adj. |
| oS1 | 46266600 | Push SW., SOURCE SELECTOR |
| oS2 | 46266700 | Push SW., DUBBING |
| oS3 | 46266400 | Push SW., REVERBERATION |

2-3. F-3720 Power Supply & Indicator Circuit Board (Stock No. 00689801)

Component Side



Parts List

| Parts No. | Stock No. | Description |
|--------------------|--|------------------------------------|
| Transistor | | |
| jQ1 | 07197001 or 07194701 or 03012701 | 2SA733A 2SA1015 2SA999 |
| jQ2 | 03059501 or 07194801 or 03068301 | 2SC945 2SC1815 2SC2320 |
| Diode | | |
| jD1, 2 | 03117600 or 46086000 | 1S2473D 1S1588 |
| Zener Diode | | |
| jDZ1 | 03177400 | RD 6.2E-B |
| jR55 | 46236100 | 220Ω 0.5W N.I.R. |
| Transistor | | |
| mQ1 | 03068301 or 07194801 | 2SC2320 2SC1815 |
| mQ2 | 03012701 or 07194701 | 2SA999 2SA1015 |
| mQ3 | 03083901 | 2SD313 |
| mQ4 | 03068301 or 07194801 or 03059501 | 2SC2320 2SC1815 2SC945 |
| Diode | | |
| mD1, 4 | 46273600 | DBB10-B |
| mD2, 3 | 03117700 | 10E-2 |
| Zener Diode | | |
| mDZ1, 2 | 03179400 | RD 16E-B |
| mDZ3 | 03178800 | RD 12E-B |
| Resistor | | |
| mR1, 2 | 46237300 | 2.2kΩ 0.5W N.I.R. |
| mR5 | 46235400 | 56Ω 0.5W N.I.R. |
| mR6 ~ 8 | 46237300 | 2.2kΩ 0.5W N.I.R. |
| mC11, 12 | 08680400 | 0.01μF 500V C.C. |
| Transistor | | |
| nQ1 | 03059501 or 07194801 or 03068301 | 2SC945 2SC1815 2SC2320 |
| nQ2 | 03059501 or 07194801 or 03068301 | 2SC945 2SC1815 2SC2320 |
| nQ3 | 03059501 or 07194801 or 03068301 | 2SC945 2SC1815 2SC2320 |
| nQ4 | 07254901 or 07206901 | 2SC1741 2SC2001 |
| Diode | | |
| nD1 | 03117600 | 1S2473D |
| pC1 | 08302600 | 0.01μF 400V C.C. |
| pS1 | 46360300 or 46360400 | Push SW., POWER Push SW., POWER |

• Note: The circuit boards, F-3715, F-3716, F-3717, F-3721 & F-3722 are not supplied as the assembled. However, the individual parts on the circuit boards are provided for orders.

2-4. F-3715 Time Delay Circuit Board

Parts List

| Parts No. | Stock No. | Description |
|-----------|-----------|--------------------------|
| jVR4 | 46266000 | 200kΩ (B) VR, TIME DELAY |
| oS4 | 46266500 | Push SW., TIME DELAY |

2-5. F-3716 Depth Volume Circuit Board

Parts List

| Parts No. | Stock No. | Description |
|-----------|-----------|---------------------|
| jVR3 | 46265900 | 100kΩ (B) VR, DEPTH |

2-6. F-3717 Effect Mode Indicator Circuit Board

Parts List

| Parts No. | Stock No. | Description |
|-----------|-----------|---------------------------|
| nLD1,2 | 46169300 | LED SEL-1210S, ECHO, DUET |

2-7. F-3721 Echo Lense Lamp Circuit Board

Parts List

| Parts No. | Stock No. | Description |
|-----------|-----------|----------------------|
| nPL1 ~ 4 | 46286600 | Pilot Lamp 12V 0.15A |

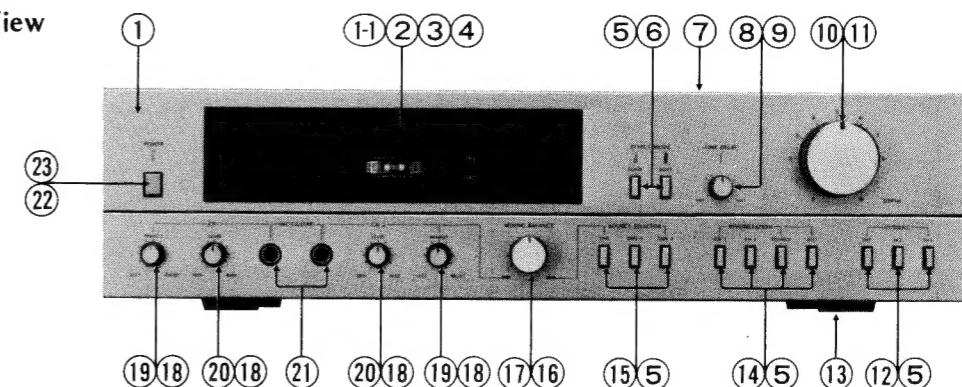
2-8. F-3722 Power Indicator Circuit Board

Parts List

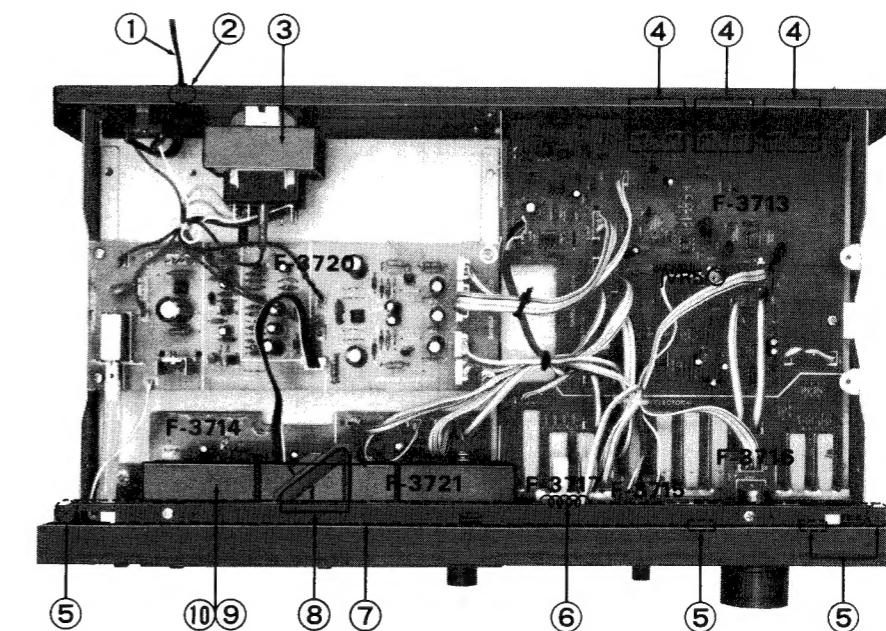
| Parts No. | Stock No. | Description |
|-----------|-----------|------------------|
| nLD3 | 46169300 | SEL-1210S, POWER |

3. OTHER PARTS

4-1. Front View



4-2. Top View



Parts List <Front View>

| Parts No. | Stock No. | Description |
|-----------|-----------|--------------------------|
| 1-1 | 07887800 | Front Glass |
| 2 | 07887600 | Echo Lens |
| 3 | 46286600 | Lamp, echo screen |
| 4 | 07895600 | Echo Film |
| 6 | 46266500 | Push SW, EFFECT MODE |
| 9 | 46266000 | 200kΩ (B) VR, TIME DELAY |
| 11 | 46265900 | 100kΩ (B) VR, DEPTH |
| 12 | 46266700 | Push SW, DUBBING |
| 13 | 07822600 | Leg |
| 14 | 46266400 | Push SW, REVERBERATION |
| 15 | 46266600 | Push SW, SOURCE SELECTOR |
| 17 | 46265800 | 250kΩ VR, MIXING BALANCE |
| 19 | 46266200 | 250kΩ VR, PANPOT |
| 20 | 46266100 | 20kΩ (B) VR, MIC LEVEL |
| 21 | 46266300 | Jack, MIC (GUITAR) |
| 23 | 46360300 | Push SW, POWER |

<Silver Model>

| Parts No. | Stock No. | Description |
|-----------|-----------|---|
| 1 | 07888500 | Front Panel Ass'y |
| 5 | 07809500 | Push Knob, EFFECT MODE, SOURCE SELECTOR, REVERBERATION, DUBBING |
| 7 | 07888300 | Bonnet |
| 8 | 07895500 | Knob, TIME DELAY |
| 10 | 07808900 | Knob, DEPTH |
| 16 | 07808700 | Knob, MIXING BALANCE |
| 18 | 07895300 | Knob, MIC LEVEL, PANPOT |
| 22 | 07809700 | Push Knob, POWER |

| Parts No. | Stock No. | Description |
|---------------|-----------|---|
| <Black Model> | | |
| 1 | 07888600 | Front Panel Ass'y |
| 5 | 07809600 | Push Knob, EFFECT MODE, SOURCE SELECTOR, REVERBERATION, DUBBING |
| 7 | 07888400 | Bonnet |
| 8 | 07764600 | Knob, TIME DELAY |
| 10 | 07809000 | Knob, DEPTH |
| 16 | 07808800 | Knob, MIXING BALANCE |
| 18 | 07895400 | Knob, MIC LEVEL, PANPOT |
| 22 | 07809800 | Push Knob, POWER |

Parts List <Top View>

| Parts No. | Stock No. | Description |
|-----------|-----------|--|
| 1 | 38004700 | Power Supply Cord |
| 2 | 39106000 | Strain Relief |
| 3 | 15007501 | Power Transformer |
| 4 | 46096800 | 4P Pin Terminal, INPUT, TAPE-1, TAPE-2, OUTPUT |
| 5 | 61467600 | Pulley |
| 6 | 69061300 | Spring, echo lens cord |
| 7 | 60360530 | Dial Cord (0.6 mmφ) |
| 8 | 07888100 | Slider |
| 9 | 07887900 | Outer Case |
| 10 | 07888000 | Inner Case |

• Abbreviations

| | |
|--|---|
| C.R. : Carbon Resistor | E.B. : Bi-Polar Electrolytic Capacitor |
| S.R. : Solid Resistor | E.B.L. : Low Leak Bi-Polar Electrolytic Capacitor |
| Ce.R. : Cement Resistor | Capacitor |
| M.R. : Metal Film Resistor | Ta.C. : Tantalum Capacitor |
| F.R. : Fusing Resistor | F.C. : Film Capacitor |
| N.I.R. : Non-Inflammable Resistor | M.P. : Metalized Paper Capacitor |
| C.C. : Ceramic Capacitor | P.C. : Polystyrene Capacitor |
| C.T. : Ceramic Capacitor, Temperature Compensation | G.C. : Gimmic Capacitor |
| E.C. : Electrolytic Capacitor | V.R. : Variable Resistor |
| E.L. : Low Leak Electrolytic Capacitor | S.V.R. : Semi Variable Resistor |
| | SW. : Switch |

A

B

C

D

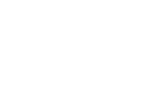
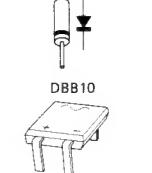
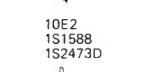
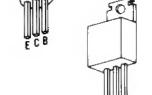
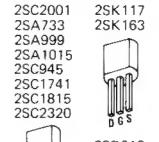
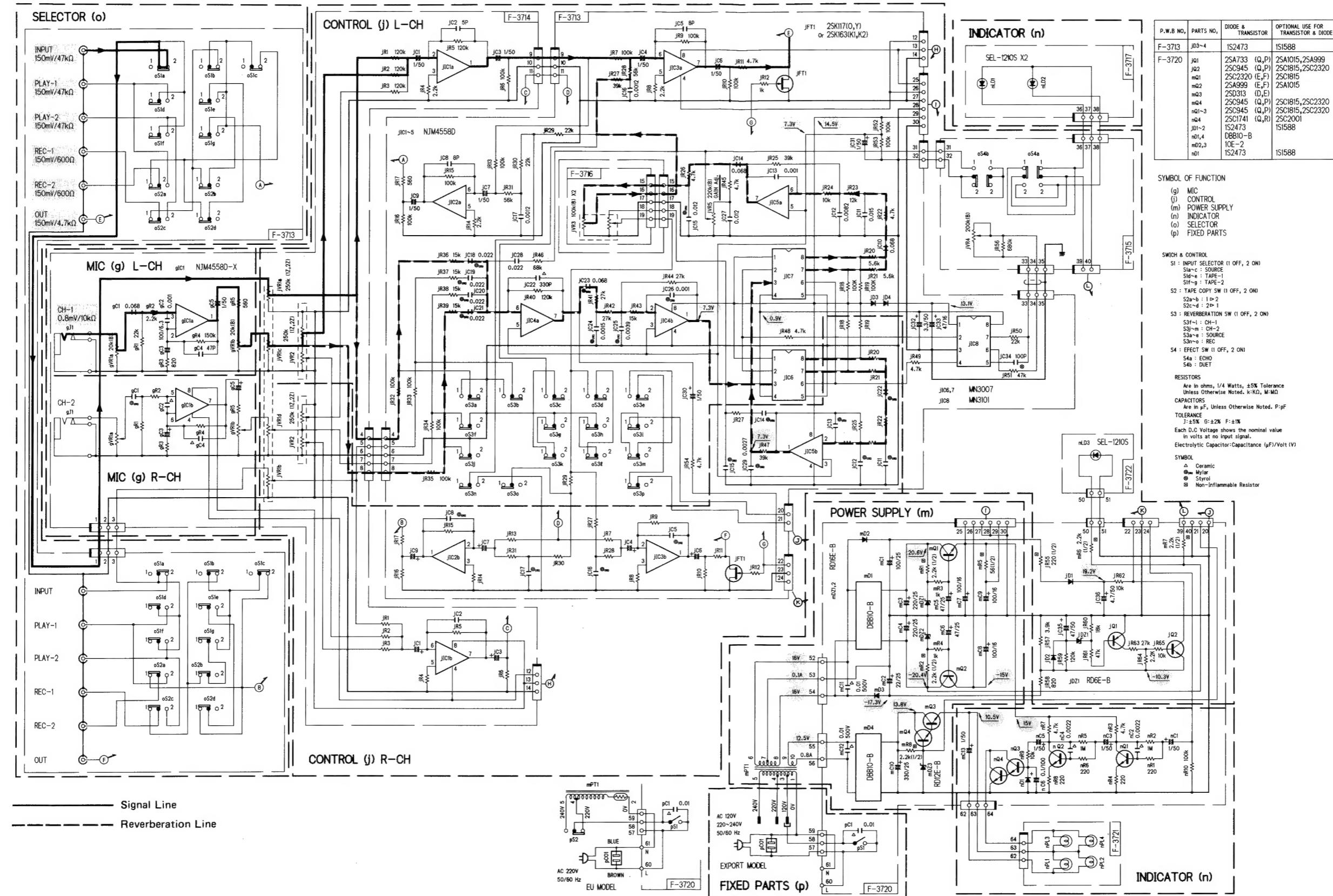
E

F

G

H

4. SCHEMATIC DIAGRAM



5. ECHO LEVEL ADJUSTMENT

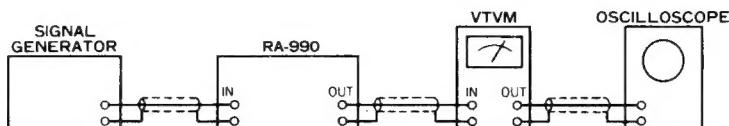
SETTING: 1) Connect the measurement units as Fig. 5-1.

2) Set the control knobs as follows.

REVERBERATION SOURCE
REVERB-MODE ECHO
CH1/CH2 LEVEL Min.

SOURCE SELECTOR LINE
TIME DELAY Max.
CH1/CH2 PANPOT Center

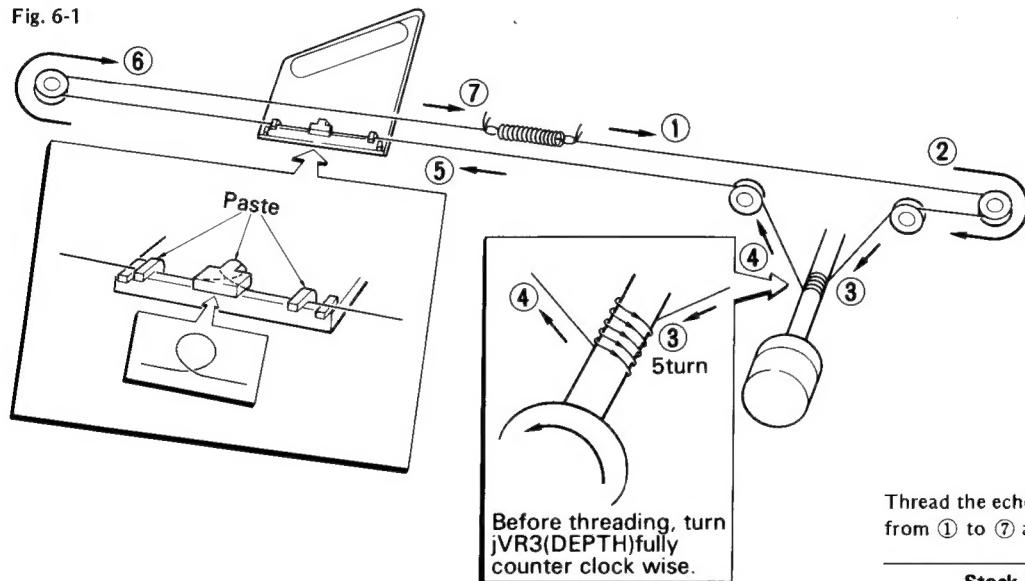
Fig. 5-1



| INPUT SIGNAL | MEASURE OUTPUT | STEP | ADJUSTMENT |
|----------------------------|-----------------------|------|--|
| 800 Hz 1.5V SG INPUT | OUTPUT VTVM, Scope | 1 | Turn the semi-variable resistor jVR5 (F-3713) fully clockwise. |
| | | 2 | Push SOURCE SELECTOR switch to set to TAPE-1 position. |
| | | 3 | Confirm that the reverberation circuit starts to oscillate, and its wave form comes out from OUTPUT. |
| | | 4 | Turn jVR5 slowly counterclockwise until the oscillation stops. |

6. THREADING OF ECHO LENS CORD

Fig. 6-1

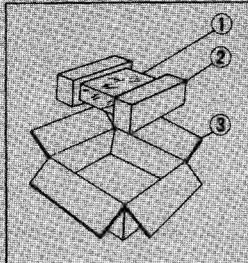


Thread the echo lens cord in numerical order from ① to ⑦ as Fig. 6-1.

| Stock No. | Description |
|-----------|--------------------|
| 69061300 | Spring (F) |
| 60360530 | Dial Cord (0.6mmφ) |

7. PACKING LIST

| Parts No. | Stock No. | Description |
|-----------|-----------|----------------------|
| 1 | 07599500 | Vinyl Cover |
| 2 | 07890100 | Styrofoam Packing |
| 3 | 07890000 | Carton Case (Silver) |
| | 07889900 | Carton Case (Black) |



8. ACCESSORY LIST

| Stock No. | Description |
|-----------|-----------------------|
| 38103300 | Pin Plug Cord |
| 46208000 | Operating Instruction |



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